Electronic Version
Stylesheet Version v1.1.1

Claims

[c1] 1. A method for controlling timing of a mobile unit, the mobile unit connected to a base station via radio communication, the base station transmitting wireless signals to the mobile unit according to a plurality of frames within a time division multiple access (TDMA) system, the mobile unit comprising:
a micro-controller unit for running a real-time operating system to load a plurality of control procedures used to control operation of the mobile unit, the control procedures including a synchronous task;
a timing generator electrically connected to the micro-controller unit for controlling timing of the mobile unit corresponding to the frames; and
a clock generator electrically connected to the micro-controller unit for generating a first clock signal to drive the micro-controller unit;
the method comprising:
using the micro-controller unit to execute the synchronous task for interrupting other control procedures currently loaded by the real-time operating system, and using the synchronous task to calculate a predetermined sleep period for a sleep mode that is used to stop the

first clock signal from driving the micro-controller unit;
using the micro-controller unit to execute the synchronous task for driving the mobile unit to stop the first clock signal from driving the micro-controller unit during an actual sleep period; and
using the micro-controller unit to execute the synchronous task for controlling the timing generator to synchronize timing of the mobile unit with timing of the base station according to the actual sleep period.

[c2] 2. The method of claim 1 further comprising:
executing the synchronous task for determining whether each of other loaded control procedures corresponds to an idle status to drive the mobile unit to enter the sleep mode.

[c3] 3. The method of claim 1 wherein the synchronous task is an interrupt service routine that has a highest priority among the control procedures.

[c4] 4. The method of claim1 wherein the predetermined sleep period is an integral multiple of a period of a frame.

[c5] 5. The method of claim 1 wherein the mobile unit further comprises a sleep mode status register for recording information corresponding to an operational status of the

sleep mode.

[c6] 6. The method of claim 5 further comprising:
executing the synchronous task for reading the information recorded in the sleep mode status register to decide whether the mobile unit needs to abort the sleep mode before entering the sleep mode.

[c7] 7. The method of claim 5 further comprising:
executing the synchronous task for reading the information recorded in the sleep mode status register to decide whether the mobile unit needs to abort the sleep mode after entering the sleep mode.

[c8] 8. The method of claim 7 further comprising:
terminating the sleep mode when an external event triggers the mobile unit.

[c9] 9. The method of claim 7 further comprising:
terminating the sleep mode after the mobile unit enters the sleep mode and undergoes the predetermined sleep period.

[c10] 10. The method of claim 3 wherein the clock generator further generates a second clock signal for counting the actual sleep period of the sleep mode after the mobile unit enters the sleep mode.

[c11] 11. The method of claim 10 wherein the mobile unit further comprises:
a first counter electrically connected to the clock generator for counting cycles of the first clock signal to generate a first count value, the first count value being stored in a first register, the first count value being reset to an initial value for re-counting the first clock signal when the first count value is increased from the initial value to achieve a predetermined count value, when the first count value is reset being a timing used to distinguish two adjacent frames; and
a second counter electrically connected to the clock generator for counting cycles of the second clock signal to generate a second count value.

[c12] 12. The method of claim 11 further comprising:
calculating a threshold value that is a total amount of cycles of the second clock signal corresponding to the predetermined sleep period, and storing the threshold value into a second register.

[c13] 13. The method of claim 12 further comprising:
after the threshold value is calculated, activating the second counter to count cycles of the second clock signal, and simultaneously storing the first count value currently counted by the first counter in a third register.

[c14] 14. The method of claim 13 further comprising:
calculating the actual sleep period according to the threshold value stored in the second register, the first count value stored in the third register, and the second count value.

[c15] 15. The method of claim 12 further comprising:
if the second count value equals the threshold value or the mobile unit is triggered by an external event, stopping the second counter and terminating the sleep mode for making the first clock signal drive the micro-controller unit.

[c16] 16. The method of claim 11 further comprising:
when the first count value counted by the first counter reaches the predetermined count value, controlling the mobile unit to start entering the sleep mode to stop the first clock signal from driving the micro-controller unit.

[c17] 17. The method of claim 10 wherein a frequency of the first clock signal is greater than a frequency of the second clock signal.

[c18] 18. The method of claim 1 wherein the synchronous task comprises:
a hardware driver for controlling a hardware setting of the mobile unit;

a sleep manager for controlling operation of the sleep mode; and

a scheduler for commanding the hardware driver to control the mobile unit.

[c19] 19. The method of claim 18 further comprising:

executing the sleep manager before the hardware driver, and executing the scheduler before the sleep manager.

[c20] 20. The method of claim 19 wherein the synchronous task is repeatedly executed for controlling the mobile unit to enter the sleep mode, and the scheduler run in a first synchronous task controls the hardware driver run in a second synchronous task following the first synchronous task.

[c21] 21. The method of claim 1 wherein the mobile unit is a cellular phone.

[c22] 22. A method for controlling timing of a mobile unit, the mobile unit connected to a base station via radio communication, the base station transmitting wireless signals to the mobile unit according to a plurality of frames within a time division multiple access (TDMA) system, the mobile unit comprising:

a micro-controller unit for running a real-time operating system to load a plurality of control procedures used to

control operation of the mobile unit, the control procedures including a synchronous task;
a timing generator electrically connected to the micro-controller unit for controlling timing of the mobile unit corresponding to the frames; and
a clock generator electrically connected to the micro-controller unit for generating a first clock signal to drive the micro-controller unit;
the method comprising:
using the micro-controller unit to assign a highest priority to the synchronous task among the control procedures;
using micro-controller unit to execute the synchronous task for calculating a predetermined sleep period for a sleep mode that is used to stop the first clock signal from driving the micro-controller unit;
using the micro-controller unit to execute the synchronous task for driving the mobile unit to stop the first clock signal from driving the micro-controller unit during an actual sleep period; and
using the micro-controller unit to execute the synchronous task for controlling the timing generator to synchronize timing of the mobile unit with timing of the base station according to the actual sleep period.

[c23] 23. A method for controlling timing of a mobile unit, the

mobile unit connected to a base station via radio communication, the base station transmitting wireless signals to the mobile unit according to a plurality of frames within a time division multiple access (TDMA) system, the mobile unit comprising:

a micro-controller unit for running a real-time operating system to load a plurality of control procedures used to control operation of the mobile unit, the control procedures including a synchronous task;

a timing generator electrically connected to the micro-controller unit for controlling timing of the mobile unit corresponding to the frames; and

a clock generator electrically connected to the micro-controller unit for generating a first clock signal to drive the micro-controller unit;

the method comprising:

using the micro-controller unit to assign a first priority to the synchronous task among the control procedures, the first priority not corresponding to a lowest priority;

using micro-controller unit to execute the synchronous task for calculating a predetermined sleep period for a sleep mode that is used to stop the first clock signal from driving the micro-controller unit;

using the micro-controller unit to execute the synchronous task for driving the mobile unit to stop the first clock signal from driving the micro-controller unit dur-

ing an actual sleep period; and

using the micro-controller unit to execute the synchronous task for controlling the timing generator to synchronize timing of the mobile unit with timing of the base station according to the actual sleep period.